



14th Annual OSC Readiness Training Program

Environment

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Environmental Suppression

What does this mean? When is it applied?

Environmental Suppression

- Definition

- Knowing your suppression tactics will have an impact on the ecosystem (physical and biological components) and taking action to minimize these impacts

Suppression Impacts

- Magnitude of impacts will vary depending on location facility and surrounding land use
- Must account for impacts to soil, water, air, and sociological factors
- Your Decisions may increase damage to the environment
- Your Lack of Decision may increase damage to the environment

Foams

- Water has limitations in cooling and penetrating class A fuels (e.g., wood, paper) because of a naturally high surface tension.
- This high surface tension causes water to form into droplets
- Class A foam reduces surface tension and allows more water to penetrate.
- One key is that foams aiding in the prevention of rekindles.

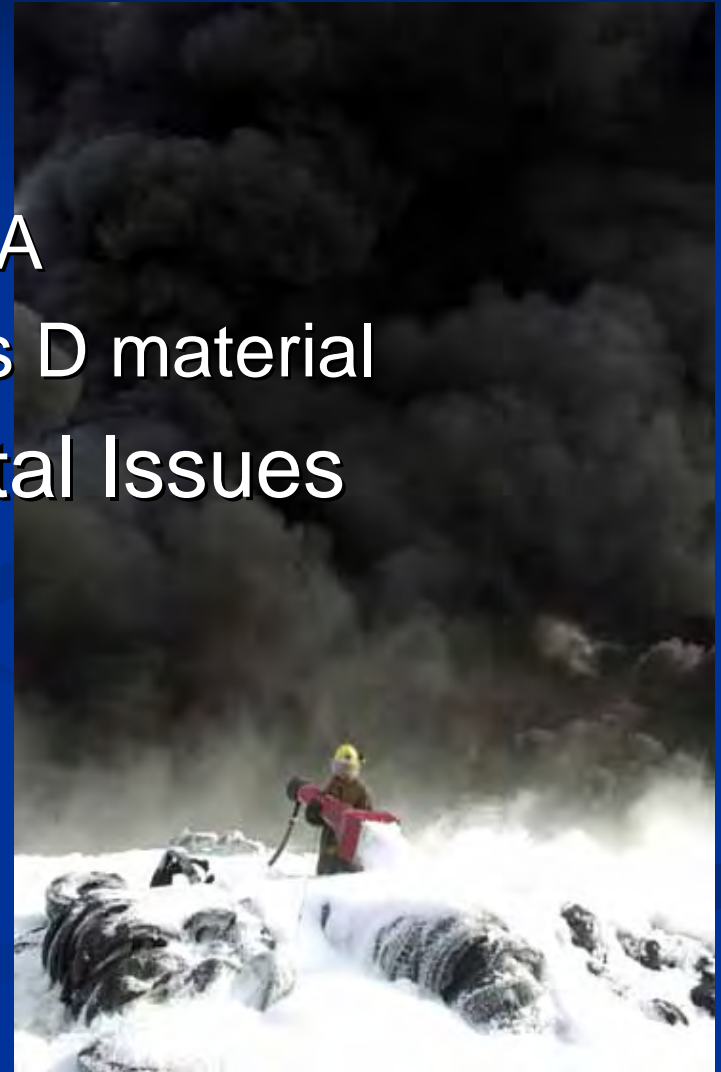
Special Sauces

- Class A - Ordinary combustible
- Class B – Flammable Liquid and gas
- Class C – Electrical
- Class D – Metal Fires
- Class K – Cooking oils



Which Foam to Use?

- Select the Class of Foam
 - Most LF Fire will be Class A
 - Some may work with Class D material
- Examine the Environmental Issues
- Determine the supply
- Do not mix foams
 - Unknown compatibility
- Find the MSDS



Foam Safety USDA

- Standard Test Procedures,
- Section 1—Health, Safety, and the Environment
 - STP 1.1—Review of Disclosure Information
 - STP 1.2—Risk Assessment
 - STP 1.3—Mammalian Toxicity
 - STP 1.4—Biodegradability
 - STP 1.5—Fish Toxicity
 - STP 1.6—Photo-Enhanced Fish Toxicity
 - STP 1.7—Cleveland Open Cup Flash Point and Fire Point

Continued Foam Tests

- Standard Test Procedures, Section 2—Fire Tests
- Standard Test Procedures, Section 3—Determination of Optimum Mixing Test
- Standard Test Procedures, Section 4—Physical Properties
- Standard Test Procedures, Section 5—Material Effects
- Standard Test Procedures, Section 6—Product Stability Tests
- Standard Test Procedures, Section 7—Pumpability Test
- Standard Test Procedures, Section 8—Class A Foam Effectiveness Tests
- Standard Test Procedures, Section 9—Water Enhancer Effectiveness Tests
- Standard Test Procedures, Section 10—Visibility Test
- Standard Test Procedures, Section 11—Air Drop Characteristics Test
- Standard Test Procedures, Section 12—Operational Field Evaluation Test
- Standard Test Procedures, Section 13—Lot Acceptance and Quality Assurance
- Standard Test Procedures, Appendix—Sources of Referenced Documents

Approved Foam

■ Per USDA Forest Service

- Ansul Silv-Ex
- FireFoam 103B 3
- Phos-Chek WD 881 4
- FireFoam 104
- Angus ForExpan S
- Pyrocap B-136
- Phos-Chek WD 881-C
- Phos-Chek Anchor Point
- National Foam KnockDown
- Summit FlameOut
- Angus Hi-Combat A 5
- Buckeye Platinum Class A Foam
- Chemguard First Class 6
- Solberg Fire-Brake 3150A 7
- Phos-Chek First Response

See

http://www.fs.fed.us/rm/fire/documents/qpl_fm1.pdf

Foam Toxicity

■ Fish Toxicity of Class A Foam Concentrates

- Rainbow Trout, 60 post hatch, 96 hr exposure
- LC₅₀ ranged from 10 mg/L to 156 mg/L for approved foams
- The lower values indicate greater toxicity
- 10 of 15 foam were below or at 30 mg/L
 - One drop in your gas tank (13 gallons) is ~ 1 ppm

http://www.fs.fed.us/rm/fire/wfcs/performance/documents/fish_fm_sum.pdf

Damage to Environmental Controls

- Landfill Fires will melt, burn, deform, or destroy environmental LF controls
- These controls are necessary to protect the public and comply with State and Federal laws and regulations
- Without controls, the landfill will be in violation

Landfill Temperatures

- At what temperature are landfill designed to handle?
 - Answer:
- Previous Landfill Fires (Surface and Subsurface) have damaged or destroy LCS, Liner, GCS, Equipment.
- The lost of these systems have increased the risk to groundwater and off site gas migration

Maximum Temperatures

- At what temp does HDPE melt?
 - Answer: Above 140 °C (284 °F)
 - Source: Welding of HDPE Geomembranes, 2007, Werner W. Muller
- At what temp does a liner start to lose its structural properties?
 - Answer:

Melted HDPE Liner



How do you Account for Exposures and Hazards

- Health and Safety Plan
- This plan documents how you intend to reduce or eliminate exposures and hazards



Health and Safety

- Everyone's Responsibility
- We can't not teach H&S for a landfill fire in a 1 hour presentation
- Your Goal:
 - to recognize the hazards
 - Take action to protect your team
 - Make a plan
 - Hire a certified industrial hygienist with LF fire experience

Health and Safety Plans

Fresno Debris

- Site safety plan developed by CIWMB and USCG
- Audited by California OSHA
- Reviewed and signed off by all personnel
- SF Landfill Fire –Last Rubble
- Small one day fire
- Extensive Real-time Air Monitoring

What about a Community Safety Plan



Past Results at Waste Fires

- LFCI has encountered H₂S at 3,000 and 25,000 ppm at the last two DLC fire projects
- CIWMB has recorded CO at 28,000 ppm
- PM 2.5 level have been recorded at hazardous levels

PM-2.5

Smoldering Fires

Color	Air Quality Rating	1-Hour Average ($\mu\text{g}/\text{m}^3$)	24-Hour Average ($\mu\text{g}/\text{m}^3$)	Actions to take
Green	Good	0 - 19.9	0 - 15.4	<ul style="list-style-type: none">No health impacts are expected when levels are within this range.
Yellow	Moderate	20 - 59.9	15.5 - 40.4	<ul style="list-style-type: none">Unusually sensitive people, such as those with asthma, should consider limiting prolonged outdoor activity.
Orange	Unhealthy for sensitive groups	60 - 99.9	40.5 - 65.4	<ul style="list-style-type: none">Active children and adults as well as people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
Red	Unhealthy	100 - 249.9	65.5 - 150.4	<ul style="list-style-type: none">Everyone, especially children, should limit prolonged outdoor exertion.People with respiratory disease, such as asthma, should avoid prolonged outdoor exertion.
Purple	Very Unhealthy	250 - 499.9	150.5 - 250.4	<ul style="list-style-type: none">Everyone, especially children, should limit outdoor exertion.People with respiratory disease, such as asthma, should avoid all outdoor exertion and limit exposure by staying inside (air conditioned spaces are best).
Maroon	Hazardous	500+	250.5+	<ul style="list-style-type: none">Everyone should avoid any outdoor exertion.